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EXAMINER	
SHAW, JOSEPH D	

ART UNIT	PAPER NUMBER
2141	5

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/636,004	DEL VAL ET AL.	
	Examiner	Art Unit	
	Joseph D Shaw	2141	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-52* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-52* is/are rejected.

7)☒ Claim(s) *14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 August 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Double Patenting

1. Applicant is advised that should claims 44 and 45 be found allowable, claims 36 and 41, respectively, will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Objections

2. Claim 14 is objected to because of the following informalities:

   a. The variables bw, PS, t_1, and t_3 are not defined in the depending claim or its parent claim. All variables should be defined as done in claim 6.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 3, 16, 21, 33, 40, and 48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

b. The term "highly entropic" in claims 3, 16, 21, 33, 40, and 48 is a relative term which renders the claim indefinite. The term "highly entropic" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

i. Since entropy is defined as the randomness of bits, it correlates directly to how compressible a set of data is. A "highly entropic" packet may still be compressible if not high enough. The Office suggests defining a specific measurement for entropy.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 6, 11-14, 19, 24, 28-31, 36, 43, 44, 46, 51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163).

c. As per claim 1, 6, 11-14, 19, 24, 29-31, 36, 43, 44, 46, 51, and 52 Lai teaches a Packet Pair technique for measuring bandwidth with two packets having a same size *s* (characteristic); the two packets queued next to each other (sending one packet immediately after the other); reception of the packets spaced apart by *t* seconds (t_3 - t_1); calculating bandwidth by dividing *t* into *s* (section IV, B, pages 238-239); and the sending and reception of data (packets, bandwidth calculations) (Fig. 1). However, Lai does not disclose the packets being non-compressible. Bharali teaches a network system that utilizes non-compressible packets in when sending messages (col. 8, lines 12-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to include non-compressible packets as taught by Bharali in the invention disclosed by Liu because use of compressible my lead to unpredictable results as taught by Bharali (col. 8, 15-17).

d. As per claim 28, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not disclose first generating a packet before sending it. However, it is inherent in the invention disclosed by Lai that the packets were generated prior to sending them.

7. Claims 2, 15, 20, 32, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claims 1, 13, 19, 30 and 46 above, and further in view of Takagi et al. (6,272,148).

e. As per claims 2, 15, 20, 32, and 47, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not disclose utilizing packets that cannot be fragmented. Takagi teaches a network system that utilizes packets that are the maximum size they can be transferred without fragmentation (col. 3, lines 9-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to make the packets the largest size possible while avoiding fragmentation as taught by Takagi in the invention disclosed by Lai/Bharali because it would avoid spending wasteful processing time and improve throughput as taught by Takagi (col. 3, 18-23), giving a better estimate of the actual bandwidth between two entities.

8. Claims 3, 16, 21, 33, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claims 1, 13, 19, 30 and 46 above, and further in view of Lawrence (6,054,943).

f. As per claims 3, 16, 21, 33, and 48, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach utilizing packets that are highly entropic. Lawrence teaches Shannon's Noiseless Coding Theorem, relating a low entropy source (packet) to having high compression ratios (col. 14, lines 1-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to avoid the low entropy sources (packets) taught by Lawrence in the invention of Lai/Bharali

because entropy is related to compression ratios as taught by Lawrence (col. 14, lines 1-3) and a higher entropy would yield lower compression ratios, resulting in non-compressible data.

Furthermore, the Examiner would like to note that entropy, in the information theory field, is defined as the randomness of data in a set, wherein the more random the data is the higher the entropy. Since data compression depends on patterns in data, higher randomness of data correlates to lower compression ratios. Therefore, it is inherent that non-compressible packets have a high measure of entropy.

9. Claims 4, 5, 17, 18, 22, 23, 34, 35, 49, and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claims 1, 13, 19, 30 and 46 above, and further in view of Kikuchi et al. (6,614,763).

g. As per claims 4, 5, 17, 18, 22, 23, 34, 35, 49, and 50, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach using either TCP or UDP formatted packets. Kikuchi teaches a bandwidth measurement system that utilizes UDP packets, but also may be used with any other appropriate type of packet (TCP) (col. 20, lines 21-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to use either UDP or any other packet format (TCP) as taught by Kikuchi in the invention of Lai/Bharali because both packet formats are common

packet formats in networks and should be used when determining the bandwidth of a connection that will later serve data formatted in those packet styles.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claim 1 above, further in view of Nishigami (5,890,010), and further in view of Microsoft (White Paper: TAPI 3.0 Connection and Media Services).

h. As per claim 7, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach verifying the result of a bandwidth outside an expected range by querying an entity's modem. Nishigami teaches that a data processing apparatus that verifies abnormal information/conditions (results) is known in prior arts (col. 1, lines 19-27). However, Nishigami does not explicitly teach querying a modem for bandwidth. Microsoft teaches a service that can detect the capabilities (bandwidth) of a device on a line (TAPI) (page 5, Finding a Suitable Line). It would have been obvious to one of ordinary skill in the art at the time of the invention to include verifying abnormal results as taught by Nishigami by querying a modem for its bandwidth as taught by Microsoft in the Lai/Bharali invention because, by verifying what appears to be abnormal bandwidth measurements, the accuracy of the data collected is kept in tact.

11. Claims 8, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claim 1, and further in view of Hosoi et al. (6,120,149).

i. As per claims 8, 9, and 10, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach storing recent bandwidth measurements in a list; performing some statistical derivation on the list to determine the most likely actual bandwidth; and more specifically finding the median of the list to determine the most likely actual bandwidth. Hosoi teaches an apparatus that makes repeated measurements and stores them into memory (list) (col. 5, lines 31-33); a statistical process (derivation) determining the typical value of the data (col. 5, lines 33-34); and more specifically that typical value being the median of the data (col. 5, lines 39-42). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a list of measurements and determining the median of the list as taught by Hosoi in the Lai/Bharali invention because a list would provide a better (better than one measurement) understanding of the bandwidth and taking the median of the list to determine actual bandwidth because the median, in math, is defined as the middle value of a set of numbers and therefore cannot be skewed by abnormally high or low measurements.

12. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claim 19, and further in view of Linzer et al. (6,005,621).

j. As per claims 25 and 26, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach sending a file or subfile formatted for the given calculated bandwidth. Linzer teaches a video server delivering high resolution video (file) over high bandwidth connections and low resolution video over low bandwidth connections (col. 7, lines 48-57), wherein the differing resolutions videos are derived from the same video source (subfiles) (Fig. 4; col. 7, lines 48-57). It would have been obvious to one of ordinary skill in the art at the time of the invention to include choosing appropriately formatted files for a given bandwidth as taught by Linzer in the Lai/Bharali invention because a version of a file formatted for low bandwidth would be considered poor quality to users with high bandwidth connections as taught by Linzer (col. 3, lines 1-15).

13. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Bharali et al. (6,216,163) as applied to claim 19, and further in view of Ranganathan et al. (5,931,961).

k. As per claim 27, Lai discloses the claimed invention modified by Bharali as described above. However, the invention does not explicitly teach the sent packet being selected from a set of differing packets. Ranganathan teaches

testing a network by sending an arbitrary sized packet (first packet) and (if necessary) sending a different sized packet (set of packets) (Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to include having a set of different packets and selecting one from it to send as taught by Ranganathan in the Lia/Bharali invention because having a different type of packet would allow for a different test to be performed if the first one fails, as taught by Ranganathan (Abstract), resulting in a better understanding of the communication path properties.

14. Claims 37, 38, 41, 42, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Chattoraj et al. (6,329,165).

l. As per claims 37, 41, 42, and 45 Lai teaches a Packet Pair technique for measuring bandwidth (section IV, B, pages 238-239). However, Lai does not explicitly teach storing recent measurements into a list used for estimating the actual bandwidth. Chattoraj teaches storing measurements into a historical data structure (list) and determining trends based on the list (col. 15, lines 21-30). It would have been obvious to one of ordinary skill in the art at the time of the invention to include a list of measurements for determining trends as taught by Chattoraj in the Lai invention because determining trends (estimating bandwidth) of multiple measurements would provide a more accurate measurement of the actual bandwidth than one measurement.

m. As per claim 38, Lai discloses the claimed invention modified by Chattoraj as described above. Furthermore, Chattoraj teaches the data structure being a first in-first out list (col. 15, line 25).

15. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Chattoraj et al. (6,329,165) as applied to 37 above, and further in view of Bharali et al. (6,216,163).

n. As per claim 39, Lai discloses the claimed invention modified by Chattoraj as described above. However, the invention does not disclose the packets being non-compressible. Bharali teaches a network system that utilizes non-compressible packets in when sending messages (col. 8, lines 12-13). It would have been obvious to one of ordinary skill in the art at the time of the invention to include non-compressible packets as taught by Bharali in the Liu/Chattoraj invention because use of compressible my lead to unpredictable results as taught by Bharali (col. 8, 15-17).

16. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lai et al. (Measuring Bandwidth) in view of Chattoraj et al. (6,329,165) as applied to 37 above, and further in view of Lawrence (6,054,943).

o. As per claim 40, Lai discloses the claimed invention modified by Chattoraj as described above. However, the invention does not explicitly teach utilizing packets that are highly entropic. Lawrence teaches Shannon's Noiseless Coding Theorem, relating a low entropy source (packet) to having high compression

ratios (col. 14, lines 1-3). It would have been obvious to one of ordinary skill in the art at the time of the invention to avoid the low entropy sources (packets) taught by Lawrence in the invention of Lai/ Chattoraj because entropy is related to compression ratios as taught by Lawrence (col. 14, lines 1-3) and a higher entropy would yield lower compression ratios, resulting in non-compressible data.

Furthermore, the Examiner would like to note that entropy, in the information theory field, is defined as the randomness of data in a set, wherein the more random the data is the higher the entropy. Since data compression depends on patterns in data, higher randomness of data correlates to lower compression ratios. Therefore, it is inherent that non-compressible packets have a high measure of entropy.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

p. Shannon (A Mathematical Theory of Communication) relates entropy to compression.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D Shaw whose telephone number is 703-305-

0094. The examiner can normally be reached on Monday - Thursday, 6:30 AM - 4:00 PM, and on alternate Fridays.

19. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rupal Dharia can be reached on 703-305-4003. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-5484.

JDS

RUPAL DHARIA
SUPERVISORY PATENT EXAMINER